"[i]t remains unclear where the hot and cold gas mixing might occur and how the gas from nozzle 62 prevents this mixing."

On the contrary, the Specification does explain where the hot and cold gases may mix and how the introduction of the conditioned gas may prevent direct contact of these two gases. In particular, the Specification clearly states that the mixing of the hot gas with the cooler gas may generally take place at the interface between the combustion chamber and the wetting chamber. For example, the Specification recites that, "[p]owder is produced due to a temperature difference between the combustion chamber and the wetting chamber at the border between the two chambers." ([amended] Specification -- pg. 4, lines 25-26.) As such, the continuous application of gas between the combustion and wetting chambers, as taught by the presently claimed case, may reduce the temperature differential between the two chambers, thereby reducing or eliminating the amount of powder produced.

Furthermore, it is noted that the introduction of gas from nozzle 62 does not prevent the hot and cold gases from mixing, but rather prevents the hot and cold gases from coming in direct contact with each other. As cited in the Specification:

> The nozzle 62 continuously supplies air or nitrogen to the plate material 61a of the guide plate 61 such that a high temperature gas and a low temperature gas do not come in contact with each other. As a result, the powder buildup at the border between the combustion chamber 10 and the wetting chamber 30 is prevented. ([amended] Specification -- pg. 9, lines 11-14.)

In particular, the statement regarding supplying gas to plate material 61A may refer to projecting gas across plate material 61A. Since plate material 61A lies within the interface between combustion chamber 10 and wetting chamber 30, any gas introduced in this region may prevent the gas from the combustion chamber from coming in direct contact with the gas from the wetting chamber. Further support for this limitation is recited on pg. 10, lines 6-8 of the amended Specification, ". . . continual application of air and nitrogen to a space of the plate 61 blocks possible contact between air of the combustion chamber 10 and air of the wetting chamber, and thus creation of a powder is substantially prevented."

Therefore, it is asserted that the manner of delivering the conditioned gas such that gas delivered from the combustion chamber may avoid direct contact with the cooler gas of the wetting chamber is taught and explained by the Specification. Accordingly, removal of the § 112, first paragraph, rejection of claim 6 is respectfully requested.

Section 112, Second Paragraph, Rejection:

Claims 2, 6, and 7-21 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. To expedite prosecution, claim 7 has been amended. This amendment is believed to clarify the claim language in a manner that addresses the concerns about those claims expressed in the Office Action. The claim language of claims 8-21 was not specifically cited in the Office Action as being indefinite, furthermore, they are dependent from claim 7; thus, claims 8-21 are believed to be definite for the same reasons as claim 7. As will be set forth in more detail below, the § 112, second paragraph, rejection of claims 2 and 6 are respectfully traversed.

Claim 2 recites, "[t]he gas scrubber according to claim 1, wherein the combustion chamber is adapted to burn flammable elements of the gas." Claim 1 defines "the gas" in relation to the guide plate component of the claimed gas scrubber. In particular, claim 1 states that the guide plate may be used to direct the gas from the combustion chamber into the wetting chamber. Such a limitation, however, does not imply that the gas be directed or reside in the wetting chamber for all limitations of the claim. On the contrary, the limitation of directing the gas from the combustion chamber to the wetting chamber serves to define the function of the guide plate rather than where the gas resides within the gas scrubber. It is, therefore, asserted that the limitation of claim 2 is definite.

The term "high" in claim 6 (recited above in reference to the § 112, first paragraph, rejection) was cited in the Office Action as being "a relative term and therefore not clear." The fact that claim language, including terms of degree, may not be precise, does not automatically render the claim indefinite under 35 U.S.C. 112, second paragraph. *Seattle Box Co., v. Industrial Crating & Packing, Inc.*, 731 F.2d 818, 221 USPQ 568 (Fed. Cir. 1984). Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed in the light of the specification. MPEP 2173.05(b). It is asserted that one of ordinary skill in the

art would understand the meaning of "relatively high temperature" as used in claim 6 to describe a gas in a combustion chamber. In particular, one of ordinary skill in the art would know that combustion chambers operate at relatively high temperatures as compared to wetting chambers. In addition, the Specification teaches that ". . . powder results from the relatively hot gas of the combustion chamber contacting a cooler gas or a cooler surface of the wetting chamber." ([amended] Specification -- pg. 3, lines 27-28). As such, the Specification teaches that the combustion chamber has a relatively higher temperature than that of the wetting chamber. Consequently, claim 6 is asserted to be definite.

For at least the reasons cited above, claims 2, 6, and 7 are asserted to be definite. Claims 8-21, which are dependent from claim 7, are believed to be definite for the same reasons. Consequently, the removal of the § 112, second paragraph, rejection of claims 2, 6, and 7-21 is respectfully requested.

Section 103(a) Rejections:

Claims 1-3, 5-8, 14, 15, and 18-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,900,217 to Hartung et al. (hereinafter "Hartung"). Claims 4, 9-13, 16, and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hartung in view of Korean Patent No. 97-9311 to Kim (hereinafter "Kim"). To establish a *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP 2143.03. As will be set forth in more detail below, the § 103(a) rejections of claims 1-21 is respectfully traversed.

None of the cited art teaches or suggests a gas scrubber comprising a means for minimizing the production and/or accumulation of a powder at the interface between a combustion chamber and a wetting chamber during the operation of the gas scrubber. Claim 1 recites, in part:

> A gas scrubber comprising . . . an injection nozzle having an opening adapted to deliver a conditioned gas above the guide plate during operation of the gas scrubber for minimizing the production and/or accumulation of a powder at an interface between the combustion chamber and the wetting chamber (emphasis added).

Amended claim 7 is similarly stated. As stated in the response to the Office Action mailed October 4, 2000, neither Hartung nor Kim present a means for minimizing the production and accumulation of a powder at an interface between a combustion chamber and a wetting chamber during the operation of a gas scrubber. Moreover, Kim does not even teach or suggest a means for minimizing the production or accumulation of a powder at an interface between a combustion chamber and a wetting chamber.

Hartung discloses a cleaning mechanism including nozzle ring 19, however, such a mechanism may only be employed when the gas scrubber is not in operation:

> For cleaning the inside of the inner pipe 16, there is, at the upper end of this pipe 16 at the cover 5, a nozzle ring 19, with which water or an absorbent can be sprayed onto the inside of the inner pipe 16 during pauses in the operation, so that deposits there can be removed or reduced (Hartung -- col. 5, lines 11-15, emphasis added).

The Office Action states "Hartung's comments do not exclude the possibility of using the nozzle ring while the gas scrubber is in operation as well." However, Hartung does not provide any teaching, suggestion, or motivation to operate nozzle ring 19 during the operation of the gas scrubber. Obviousness can only be established by combining or modifying the teaching of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Furthermore, activating nozzle ring 19 during the operation of the gas scrubber of Hartung may render the device inoperable. If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1124 (Feb. cir. 1984), MPEP 2143.01. Hartung teaches spraying water or an absorbent onto the inside of inner pipe 16, which encompasses combustion space 6. The addition of water or absorbent to combustion space 6 during its operation may alter or terminate the functionality of the combustion space, since such a space must be kept a relatively high temperature. The powder

minimizing means of the presently claimed case, however, does not introduce such a fluid into combustion chamber 10 and, therefore, does not alter the operation of the combustion chamber.

In addition, the Office Action states that, "the interface between the combustion space and wetting chamber [of Hartung] is at the end of inner pipe 16." On the contrary, the interface between combustion space 6 and scrubbing space 7 lies within the region of annular gap 10 adjacent to the inner wall of outer pipe 1 above and below cover 5. As such, the activation of nozzle ring 19 of Hartung is not adapted to clean the interface between the combustion and wetting portions of the gas scrubber as in the presently claimed case. On the contrary, Hartung only cleans the inner surface of pipe 16, which is positioned entirely within combustion space 6.

For at least the reasons cited above, none of the cited art teaches or suggests the limitations of claims 1 or 7. Claims 2-6 and 8-21, which are dependent from claims 1 and 7, respectively, are patentably distinct for at least the same reasons. Accordingly, removal of the § 103(a) rejections of claims 1-21 is respectfully requested.

In addition, the statements in the Office Action referring to certain limitations as mode of operations instead of structural features of the apparatus are traversed. For example, the Office Action states in reference to claim 1 that, "the injection nozzle during operation of the scrubber is a mode of operation and not a structural feature of the apparatus." Claim 1 recites in part:

> . . . an injection nozzle having an opening adapted to deliver a conditioned gas above the guide plate during operation of the gas scrubber for minimizing the production and/or accumulation of a powder at an interface between the combustion chamber and the wetting chamber.

Claim 7 is similarly stated. "Adapted to" is used in the present claims to impart proper functional limitations. The use of "adapted to" in the present claims constitutes a functional limitation in that it defines something (e.g. delivering a gas) by what it does, rather than by what it is. Functional language does not, in and of itself, render a claim improper. *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971), MPEP 2173.05(g). Functional limitations involving "adapted to", like any other claim limitations, must be evaluated and considered for what they fairly convey to a person of ordinary skill in the pertinent art. MPEP 2173.05(g). Such an

evaluation may be used to show that the functional limitation involving "adapted to deliver a conditioned gas . . . during operation of the gas scrubber" is definite and proper, as illustrated by more recent court decisions.

For example, claim language calling for a sleeve "adapted to be fitted" over an insulating jacket has been ruled to impart structural limitation to the sleeve rather than to merely direct activities which may take place in the future. *In re Venezia*, 189 USPQ 149 (CCPA 1976), MPEP 2173.05(g). The court's opinion states in part:

> As we view these claims, they precisely define a group or 'kit' of interrelated parts. These interrelated parts may or may not be later assembled to form a completed connector. But what may or may not happen in the future is *not* a part of the claimed invention. The claimed invention does include present structural limitations on each part, which structural limitations are defined by how the parts are to be interconnected in the final assembly, if assembled (emphasis in original).

The opinion further states:

> Again, a present structural configuration for the housing is defined in accordance with how the housing interrelates with the other structures in the completed assembly . . . More particularly, we find nothing indefinite in these claims. One skilled in the art would have no difficulty in determining whether or not a particular collection of components infringed the collection of interrelated components defined by these claims.

A similar line of reasoning may properly be applied to the functional limitations in the present claims. For example, consider the limitation of "an injection nozzle adapted to deliver a conditioned gas . . . during the operation of the gas scrubber." One of ordinary skill in the art of semiconductor fabrication would have no difficulty in determining whether an injection nozzle was adapted to operate during the operation of a gas scrubber. The phrase "adapted to deliver . . . during the operation of the gas scrubber" in claim 1, therefore, provides a positive limitation on the design of the injection nozzle. For at least the reasons set forth above, the use of the phrase "adapted to" in the present claims is believed to limit these claims so as to the function of the device.

NOTICE OF CHANGE OF ADDRESS

The Commissioner is respectfully requested to change the correspondence address for the above-identified patent application as follows:

New Address: Kevin L. Daffer
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P.O. Box 398
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CONCLUSION

In this response, claim 7 has been amended for clarification purposes only. Applicant has responded to rejection of claims 1-21. Therefore, this response constitutes a complete response to all issues raised in the Office Action dated March 22, 2001. In view of the remarks traversing the rejections, Applicant asserts that pending claims 1-21 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned attorney earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees, which may be required, or credit any overpayment, to Conley, Rose & Tayon, P.C. Deposit Account No. 50-1505/5480-00200.

Respectfully submitted,

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MEH

ATTACHMENT A
"Marked-Up Amendments

IN THE CLAIMS:

Please amend claim 7 as follows:

7. (Twice Amended) A gas scrubber comprising:

a combustion chamber for eliminating explosive and flammable elements contained in a gas delivered into the combustion chamber from a gas intake;

a wetting chamber placed below said combustion chamber to receive the gas from the combustion chamber and dissolve a water soluble element of the gas; and

a means for minimizing a powder produced at an interface between said combustion chamber and said wetting chamber, wherein said means for minimizing is [conducted] adapted to operate during the operation of the gas scrubber.